GRISWOLD SIGNAL CO.

MINNEAPOLIS, MINNESOTA

INSTALLATION

and

MAINTENANCE

of the

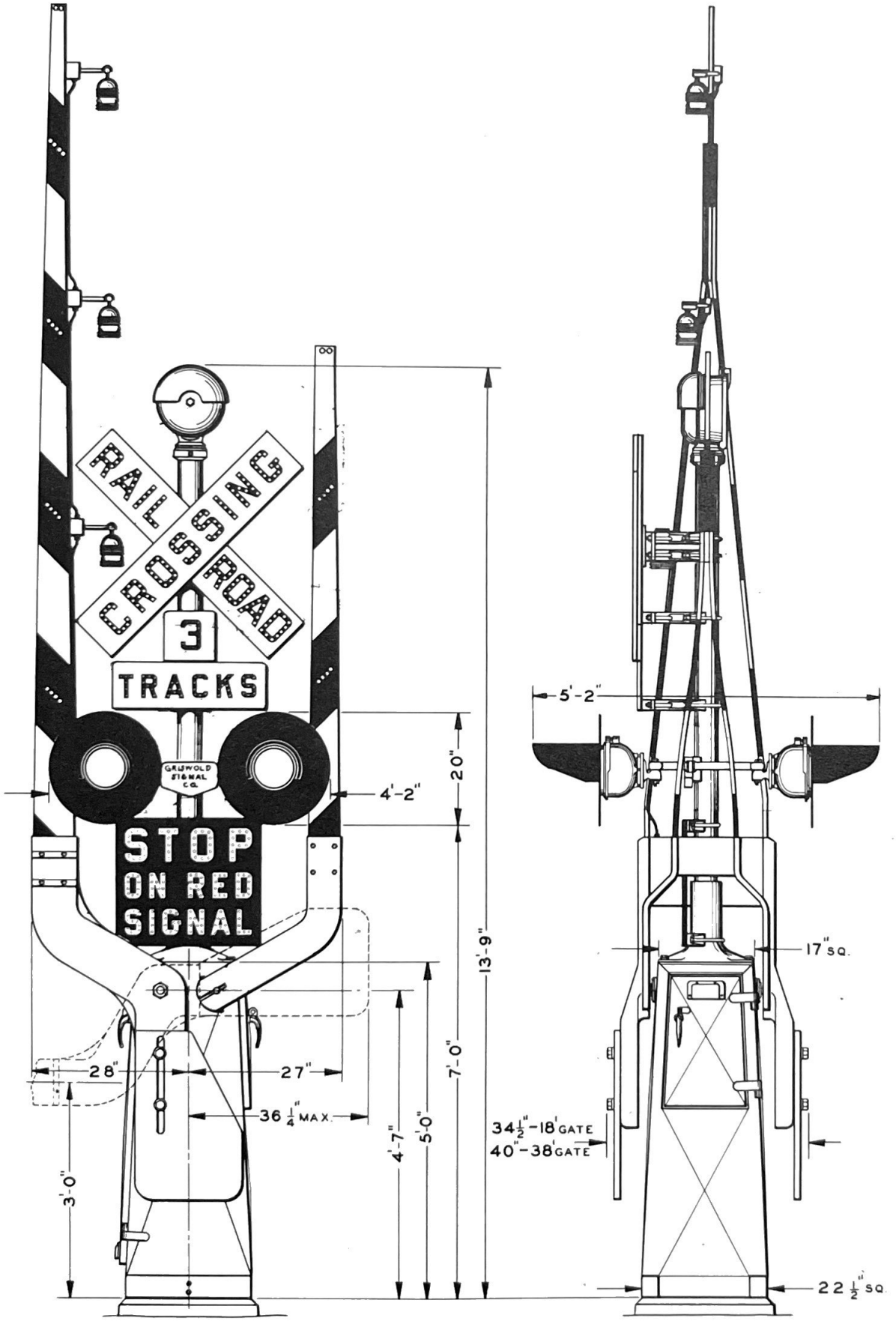
GRISWOLD

Automatic Crossing Gate

ORDERING REFERENCES

		Page
B1	Automatic Crossing Gate, complete. Specify length of arms and number for track sign	2
B2	Automatic Crossing Gate, complete, less sidewalk arm. Specify length of arm and number for track sign	2
B10	Precast Foundation	6
B11	Gate arm shaft, complete with bearings, bearing retainers, segment gear and buffer catch	8
B12	Pedestal only	8
B13	Mast and mast base combination	10
B14a	Flashing light assembly, complete	12
B15	D.C. bell	14
B16	A.C. bell	14
B17	Pinnacle	14
B18	Crossing sign, complete. (reflectorized)	16
B19	Crossing sign, complete. (scotchlite)	16
B20	Track sign (reflectorized). State number	16
B21	Track sign (scotchlite). State number	16
B22	Stop on red signal sign. (reflectorized)	16
B23	Stop on red signal sign. (scotchlite)	16
B24	Gate arm support. (State right or left)	18
B25	Gate arm complete. (State length from center of pedestal and lamp spacing from tip)	18
B26	Gate arm without lamps or wiring. (State length from center of pedestal)	18
B27	Gate arm weight with casting. (State whether for left or right support and thickness of steel plate)	20

		Page
B28	Gate arm weight without casting. (State thickness)	20
B29	Buffer, complete	24
B30	Mechanism, complete. (Without gate arm shaft)	26
B31	Motor, complete without pinion and flexible coupling	28
B32	Pinion and flexible coupling	28
B33	Hold clear, complete with wiring	30
B34	Controller, complete with connecting rod	32
B35	Gate arm lamp, without shades	34
B36	Gate arm lamp shades. (1 pair)	34
B37	Stop rod, complete	34
B38	Cam adjusting wrench	34
B39	Gate arm support puller	34
B40	One buffer adjusting wrench	34
B41	Gate arm wrench	34
B42	Sidewalk arm supports. (State right or left)	35
B43	Sidewalk arm. (State length)	35
B44	Sidewalk arm drive, complete	35
B100	Sidewalk gate, complete. (State length of arm from center of pedestal)	38
B110	Sidewalk gate pedestal, only	38
B111	Sidewalk gate shaft, complete	38
B112	Sidewalk gate arm support	38
B113	Sidewalk gate buffer, complete	38
B114	Sidewalk gate counterweight	38


RAIL ROAD CROSSING
3
TRACKS
GRISWOLD SIGNAL CO.
STOP ON RED SIGNAL
4'-2"
20"
13'-9"
7'-0"
5'-0"
4'-7"
28"
27"
36 1/4" MAX.
3'-0"
5'-2"
17" sq.
34 1/2"-18' GATE
40"-38' GATE
22 1/2" sq.

The Griswold Automatic Crossing Gate is composed of a steel pedestal, which houses the controller, operating mechanism, motor, hold clear, and buffer in the upper portion, and necessary terminals and resistors in the lined lower portion.

On the outside of the pedestal are mounted the gate arm supports holding the gate arm. On the top of the pedestal is mounted a mast holding the flashing light unit, necessary signs, and a bell, if required.

Everything contained in the pedestal is assembled in place and adjusted at the factory. All wiring from motor, hold clear, and controller is installed and run-to terminals in the lower part of the pedestal.

Gate arm supports, counterweights, gate arm, mast, flashing light assembly, bell and necessary signs must be installed in field.

INSTALLATION PROCEDURE

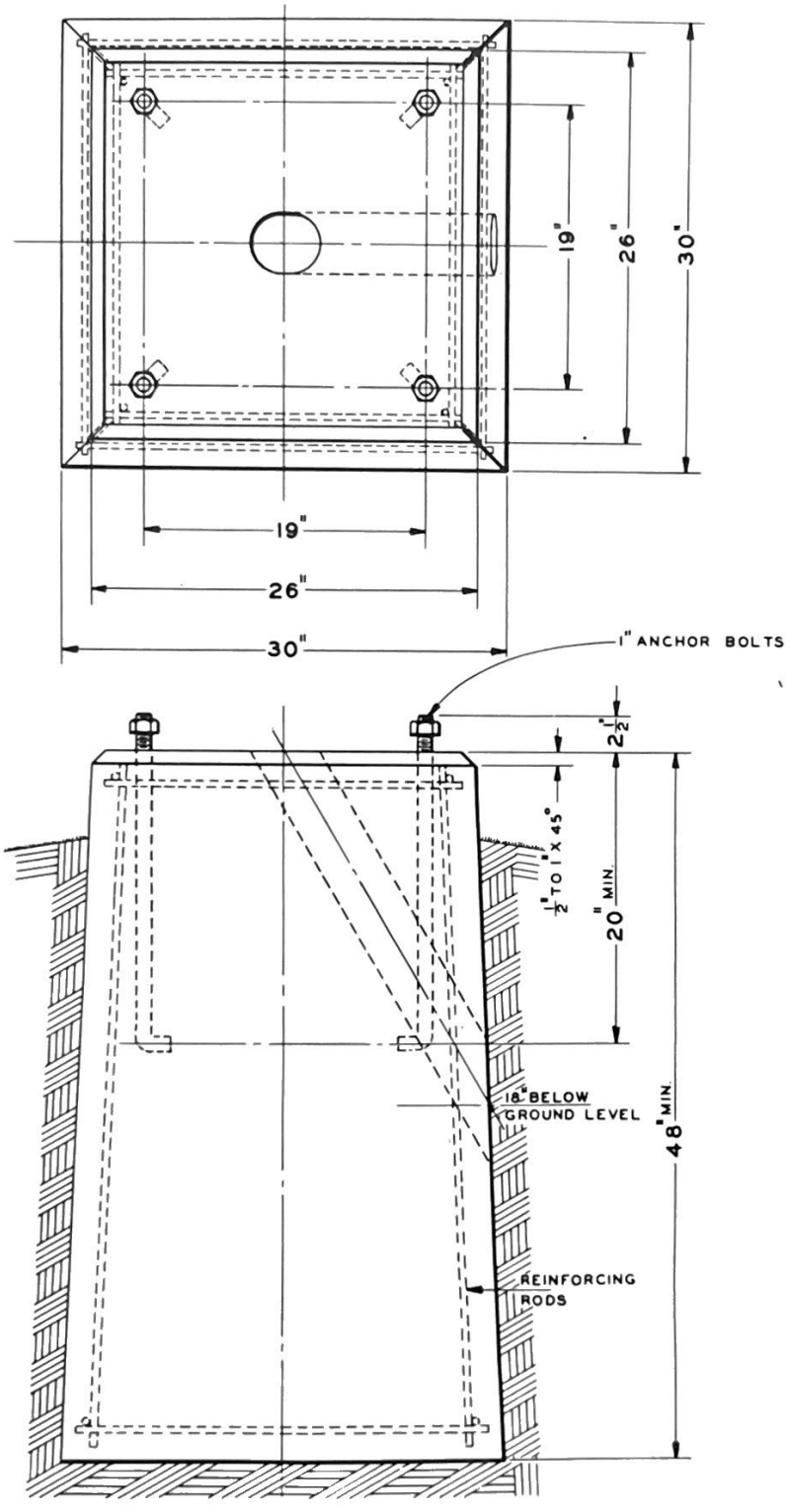
1. Pour or Set Concrete Foundation . . . . . See Page 7
2. Mount Pedestal on Foundation . . . . . See Page 9
3. Mount Mast on Pedestal . . . . . See Page 11
4. Install Flashing Light Unit on Mast . . . . . See Page 13
5. Mount Bell or Pinnacle on Mast . . . . . See Page 15
6. Install Signs on Mast . . . . . See Page 17
7. Mount Gate Arm Supports and Gate Arm . . See Page 19
8. Mount Counterweights and Adjust Torque . . See Page 21
9. Connect Wires From Relay Case To Proper Terminals in Pedestal—See Wiring Diagram See Page 22
10. Adjust Buffer to Hold Gate Arm Horizontal . See Page 25
11. Adjust Controller Connecting Rod Until Gate Arm is Vertical in Clear Position . . . . . See Page 33
12. Check Holding Current—Should Be 24 Milli-amperes at 12 Volts . . . . . See Page 31
13. Check for Voltage Drop at Motor When Gate Is Clearing . . . . . See Page 29
14. Run Wires from Gate Arm Lamps to Proper Terminals and Connect Flexible Cable . . . . See Page 22
15. Adjust and Focus Flashing Lights . . . . . See Page 13

MAINTENANCE

(Every 3 to 6 Months)

1. Fill Oil Cup on Buffer . . . . . See Page 25
2. Fill Oil Cups and Oil Gears on Mechanism . . . See Page 27
3. Oil Hold Clear Ratchet Wheel . . . . . See Page 31
4. Fill Oil Cups on Controller . . . . . See Page 33

FOUNDATION


19"
26"
30"
19"
26"
30"
1" ANCHOR BOLTS
2½"
½" TO 1" X 45°
20" MIN
18" BELOW GROUND LEVEL
48" MIN.
REINFORCING RODS

FOUNDATION

The foundation may be poured in place, using dimensions given on Page 6, or may be purchased in pre-cast form from the company. When poured in field a "one, two, three" mix at about a four inch slump, using a three-quarter to one inch aggregate and at least a ten day curing period is recommended.

The placing of the foundation is important.

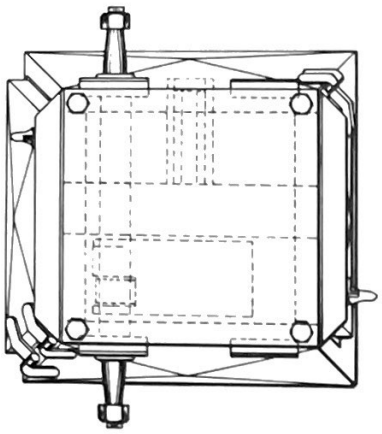
The top foundation must be six inches above crown of road and level. The use of a spirit level is recommended.

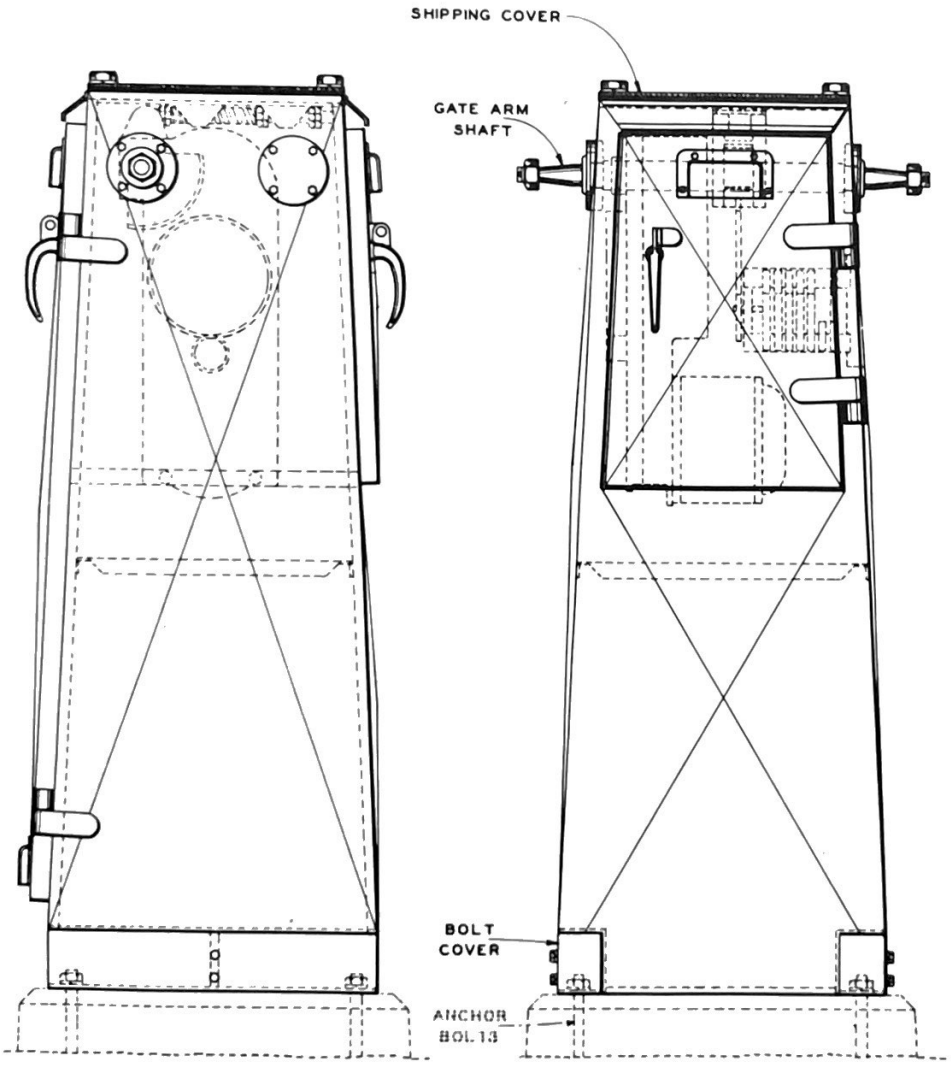
If the gate is to be at right angles to the road, the foundation must have one side parallel to the road.

If the gate is to be parallel to the tracks, the foundation must have one side parallel to the tracks.

In locating the foundation, it must be remembered the gate arm length is figured from its center.

PEDESTAL





PEDESTAL

Installation

The pedestal is made of heavy steel, formed and reinforced for maximum strength and durability. It contains all the operating equipment and the gate arm shaft, and should be handled carefully to protect mechanism alignment and bearings.

Before mounting pedestal on foundation, place about a half-inch rounded strip of signal cement or plastic putty on top of foundation between and behind anchor bolts. This flattens out and acts as a moisture seal between base of pedestal and foundation.

Remove bolt covers at base and place pedestal on foundation with full length door facing road. Oversize holes in pedestal will allow for a small amount of final aligning.

Be sure nuts are tightened securely on anchor bolts before replacing bolt covers.

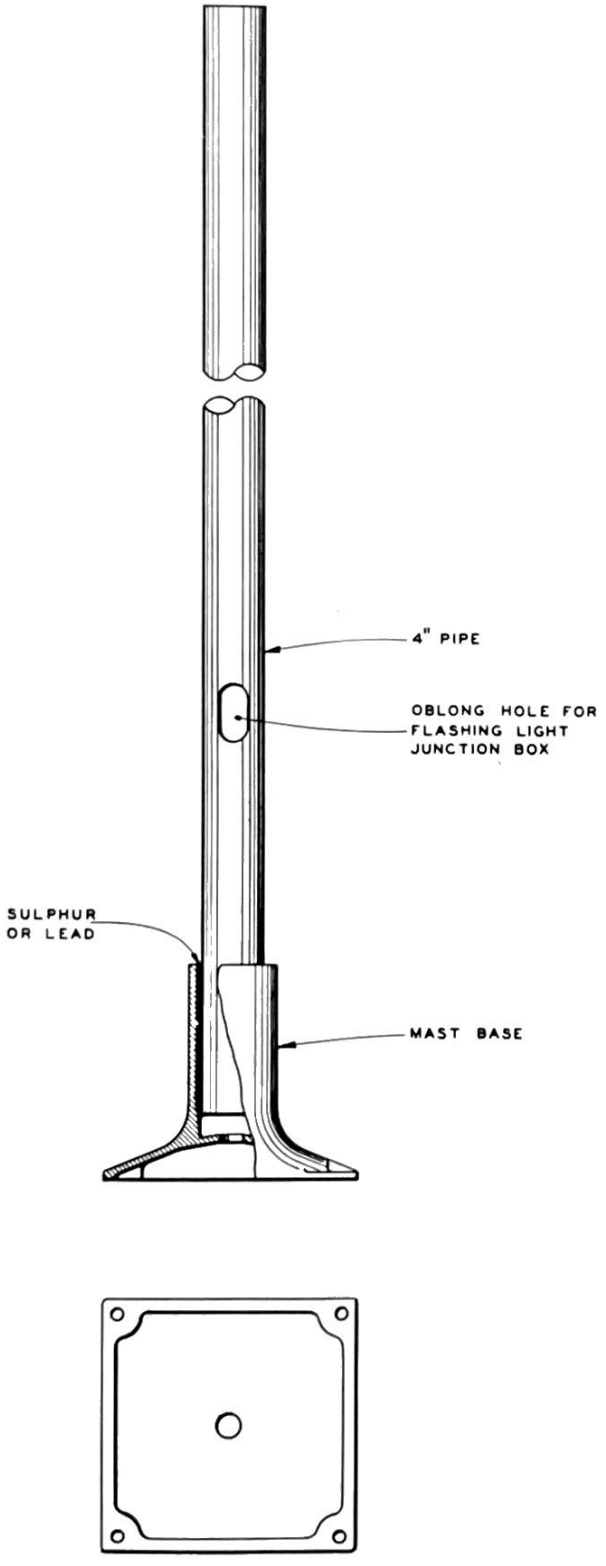
Maintenance

The pedestal is protected with a coat of primer and a coat of aluminum paint at the factory. By the time the installation is complete, it will probably be dirty and scratched from shipping, handling, mounting, etc. When the installation is completed, the pedestal should be cleaned and all the scratches touched up with aluminum paint. A complete paint job should be given all exposed metal at this time.

Periodic checking for rust and painting will preserve the steel in the pedestal indefinitely.

The bearings for the gate arm shaft need no attention. They are made especially for the job by the bearing manufacturers who pack them with a special grease which will not change consistency with extremes of temperatures, and shields them to retain the grease and exclude dirt.

MAST


4" PIPE
OBLONG HOLE FOR
FLASHING LIGHT
JUNCTION BOX
SULPHUR
OR LEAD
MAST BASE

MAST

Installation

The mast is made from a length of four-inch pipe with an oblong hole cut for the flashing light junction box, and mounted in a cast iron base with sulphur.

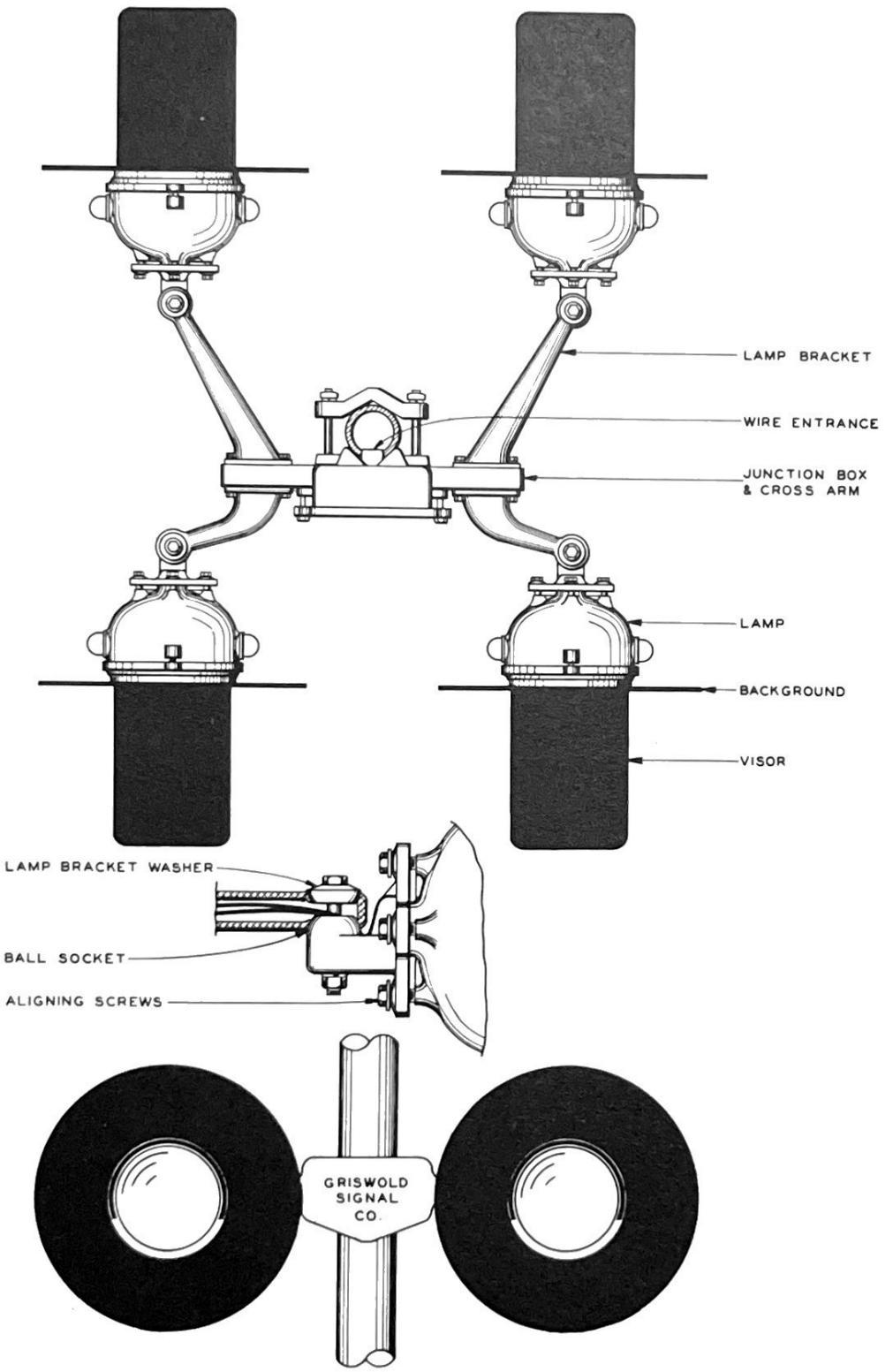
To mount mast, first remove shipping cover from top of pedestal, see Page 8. Place mast on top of pedestal with oblong hole for flashing light junction box facing away from the tracks. Bolt mast base securely to top of pedestal, using cap screws used to fasten shipping cover.

Maintenance

The mast is protected from weather with a coat of primer and a coat of aluminum paint at factory. This coating is probably dirty and scratched from handling and installing. When installation is complete, mast should be cleaned and repainted.

Periodic painting will help preserve mast and mast base.

FLASHING LIGHT ASSEMBLY



FLASHING LIGHT ASSEMBLY

Installation

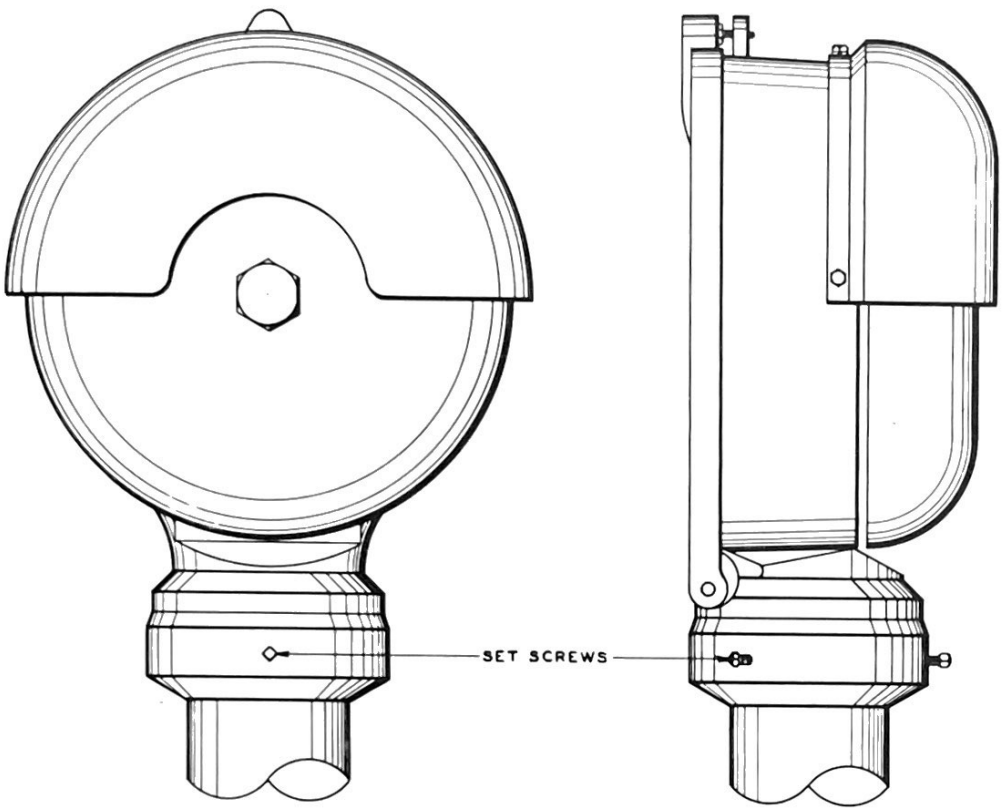
The flashing light assembly is composed of several magnesium-aluminum alloy castings with steel backgrounds and visors, and A.A.R. approved lens and reflectors. The alloy castings give the assembly improved strength and durability, yet is light enough for one man to handle and install. It is shipped complete in one package.

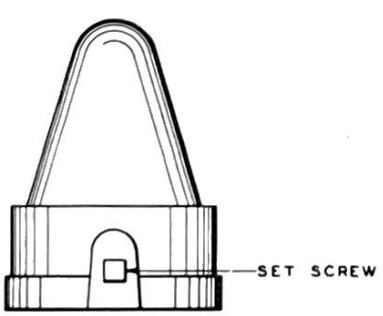
To mount lamp assembly, clamp to mast with wire entrance in oblong hole in mast. See Page 10 for hole. Remove backgrounds and visors from containers, and fasten to lamps with screws furnished. When assembly is complete and securely fastened to mast, connect wires from terminals in junction box to corresponding terminals in lower half of pedestal. These wires are to go through entrance hole in back of junction box, down inside of mast, through hole in mast base, down corner of pedestal through loops furnished, and through hole in shelf to terminals.

Aligning

When current is in, align lamps. This is done by opening front of lamp and swinging lens out of way; loosening the nut which holds the ball in the ball socket just enough for lamp to be turned in ball socket. With the lamp on, and someone down road in desired location, turn lamp until it is roughly aligned on man in road. The man in road can tell when lamp is aligned on him, as the light will be strong enough to blind him in full daylight. When lamp is roughly aligned, tighten nut securely, and do the finish aligning. The finish aligning is done with the four aligning screws in the back of the lamp. By loosening and tightening the proper screws the lamp may quickly be brought to the final correct alignment.

BELL-PINNACLE





BELL-PINNACLE

Installation

The bell or the pinnacle is next to be installed.

The pinnacle fits on top of mast and is held with a set screw.

The bell fits on top of mast and is held with set screws. The bell wires go down the center of mast to inside of pedestal. One wire goes to proper terminal on controller, see Page 22. The other wire goes to proper location on terminals located in lower portion of pedestal.

SIGNS

SIGNS

Installation

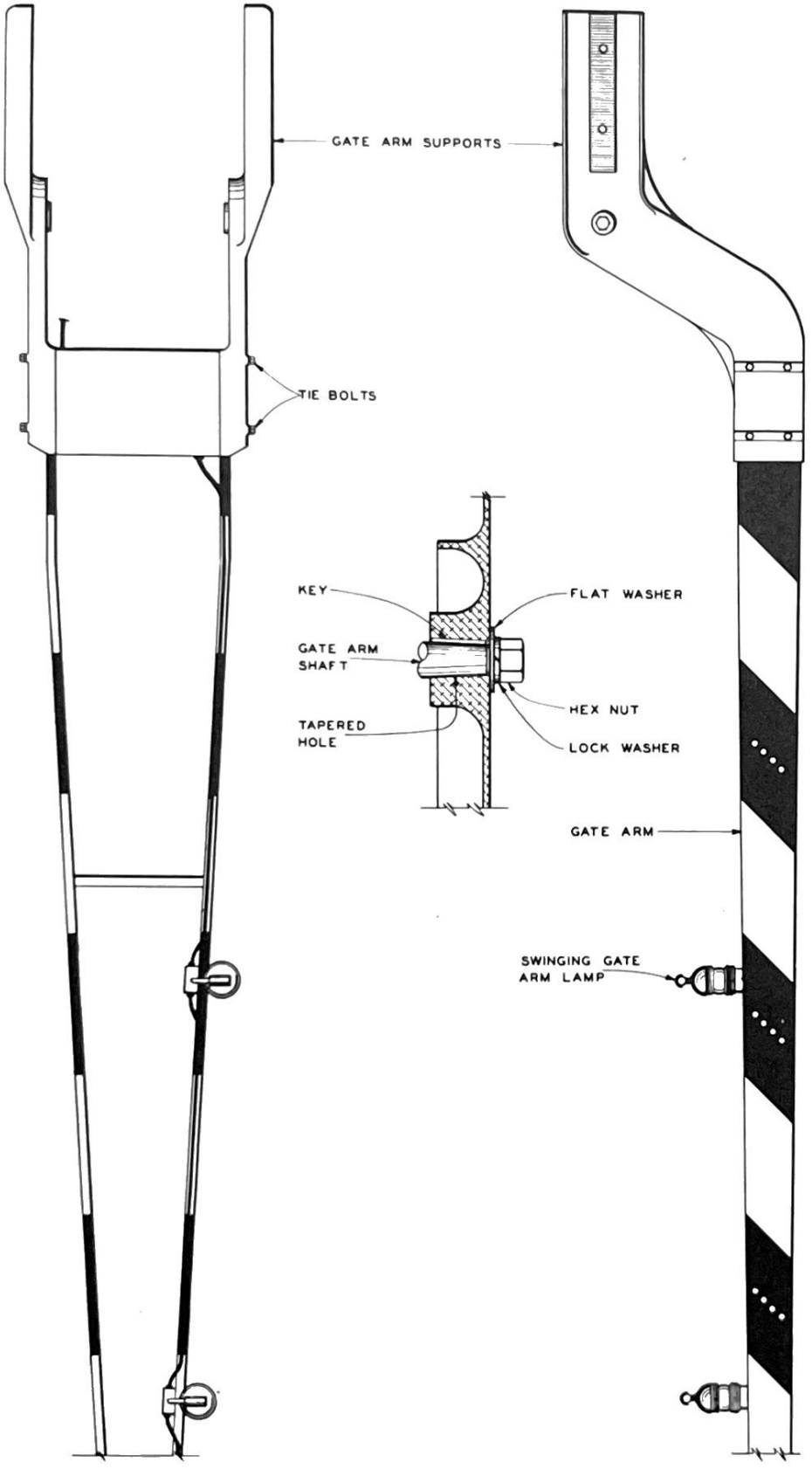
The signs are standard signs. They come packaged and with proper U bolts for clamping to mast.

The crossing sign is clamped to the top of mast.

The track sign is clamped to mast between crossing sign and flashing light assembly.

The "stop on red signal" sign, when used, is mounted under the flashing light assembly.

GATE ARM SUPPORTS & GATE ARMS



GATE ARM SUPPORTS & GATE ARMS

Installation

The gate arm supports are magnesium-aluminum alloy castings; strong, tough, and durable, yet light enough for one man to handle. These are fastened to the ends of the gate arm shafts, as shown on Page 18.

The ends of the gate arm shafts are tapered to fit the taper hole in the gate arm supports. The taper is to insure a tight fit. The large keys in the gate arm shaft hold the arms from turning on the shaft.

Before tightening the nuts on the ends of the gate arm shaft, insert the base of the gate arm between the gate arm support castings, and bolt securely with the bolts furnished.

After gate arm is securely fastened, tighten the nuts on the end of the gate arm shafts. This is important, as a loose fit will allow the key to wear in the support casting.

Gate arms are made from No. 1 clear pine or redwood and painted to conform to A.A.R. specifications. The gate arm lamps are assembled and wired at the factory. The gate arms are packaged in one or two sections, depending on their length.

COUNTERWEIGHTS AND TORQUE ADJUSTMENT

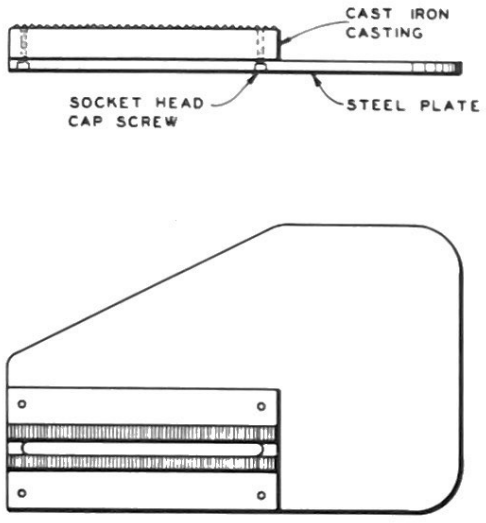


FIG. 1

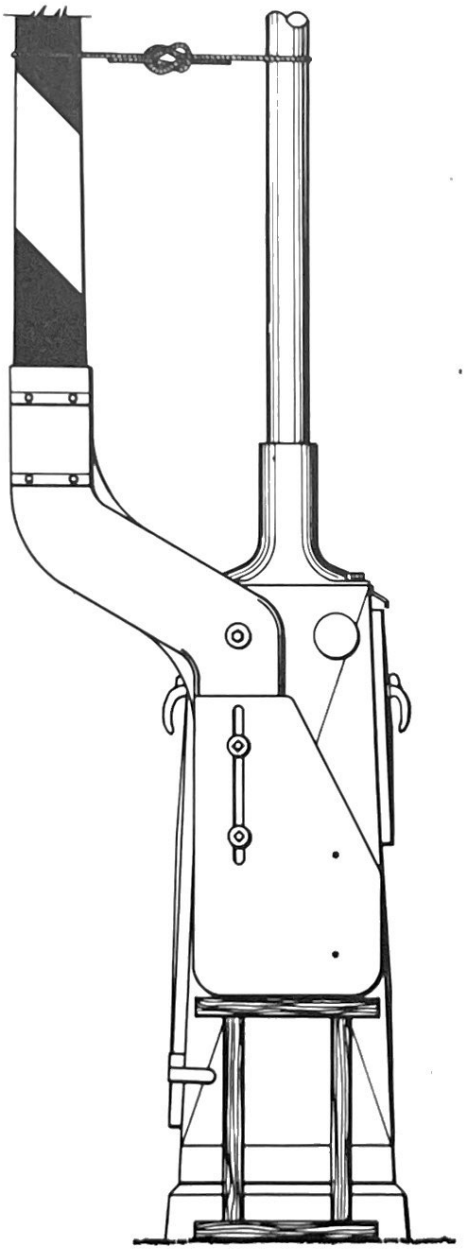


FIG. 2

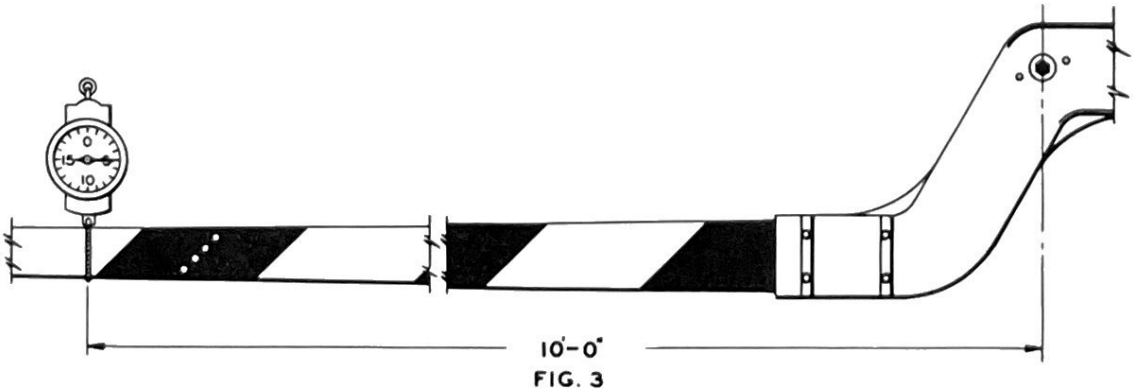


FIG. 3

COUNTERWEIGHTS AND TORQUE ADJUSTMENT

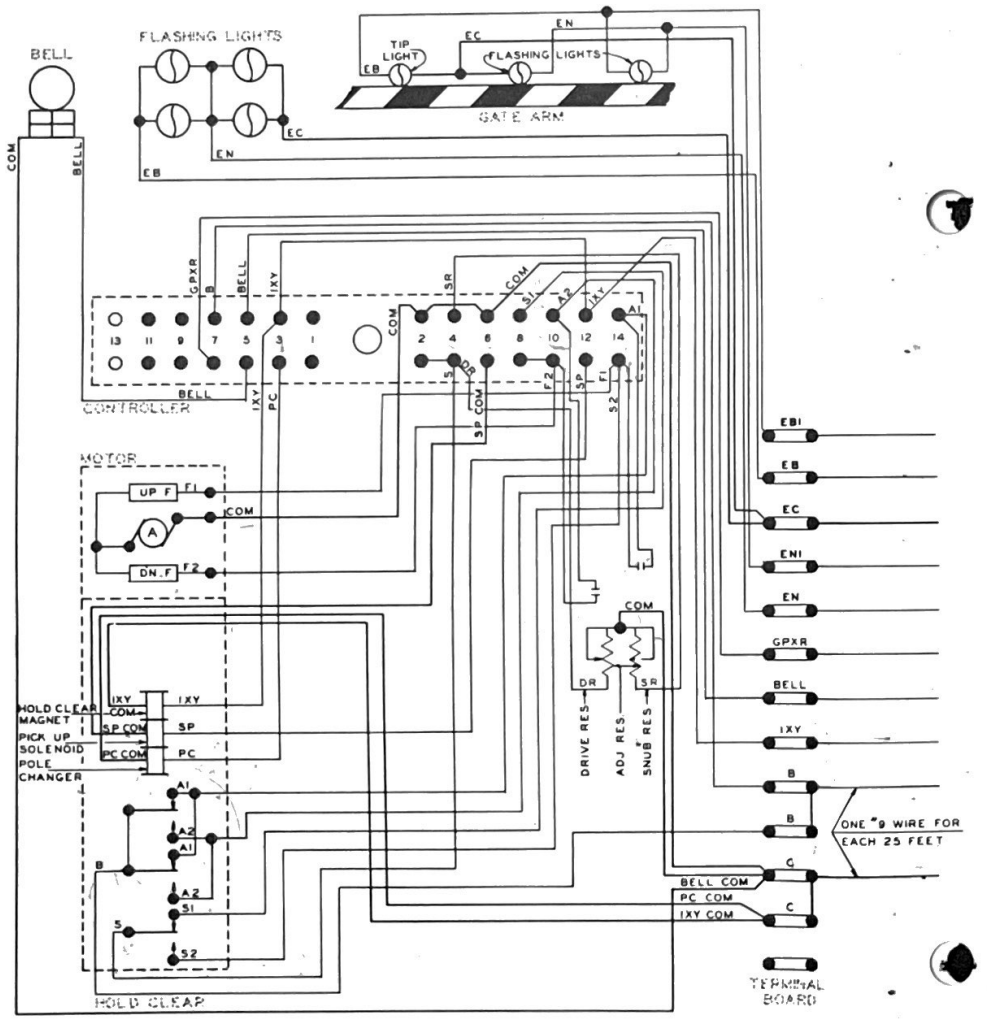
Installation

The counterweights, Figure 2, Page 20, are composed of cast iron castings with steel plates bolted to them and additional steel plates for the longer gate arms. The cast iron weights are serrated to match the serrations on the gate arm supports and all weights are slotted down the center for adjustments.

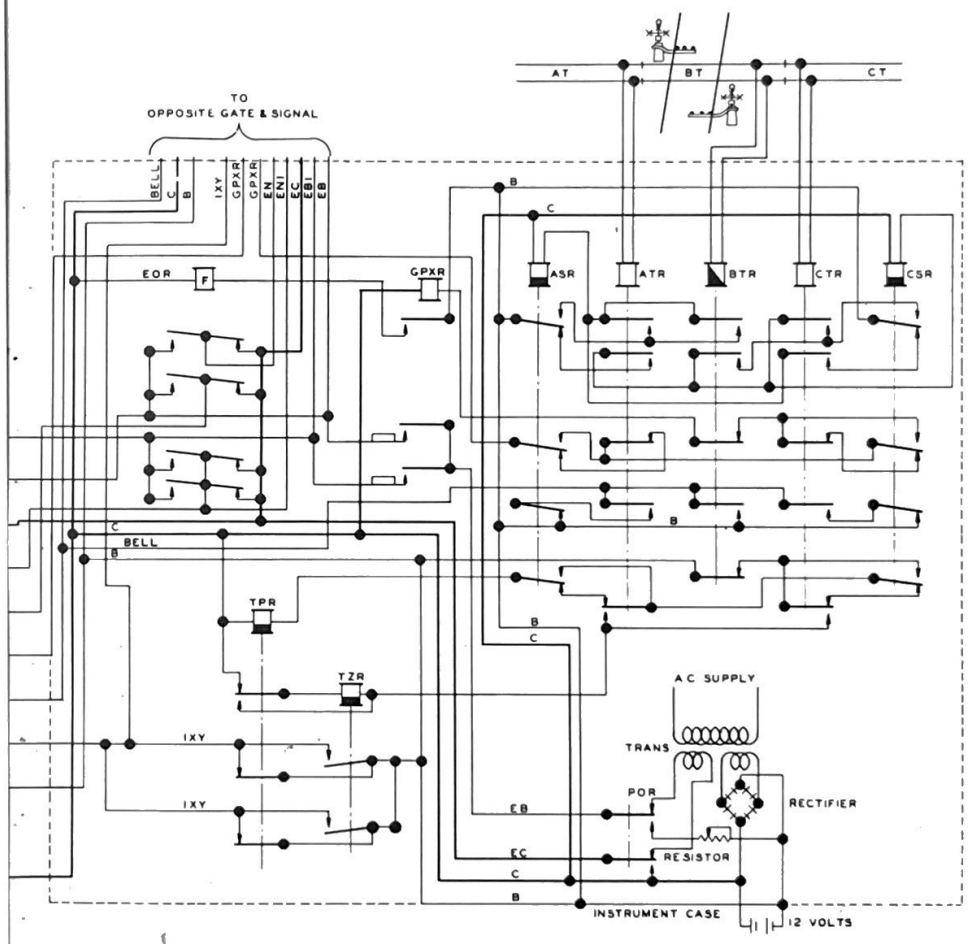
The counterweights are installed so that hump on the steel plate is facing away from the road when the gate arm is in a vertical position, Figure 2, Page 20. When there is more than one steel plate, it is sometimes difficult to mount them on the gate arm supports. If this should be the case, the weights can be installed most simply by tying the gate arm in a vertical position, see Figure 2, Page 20. Put a block or two of wood under the gate arm supports and set the weights on them. Bolt the weights in place with the cap screws furnished.

Torque Adjustment

The torque on the gate arm shaft, with the gate in horizontal position, should be 50 foot-pounds. This is obtained by sliding the counterweights backward or forward until scale reads 5 pounds, 10 feet from center of the gate arm shaft, see Figure 3, Page 20. The torque adjustment should be made with buffer arm pin removed, see Page 24.



CONTACT OPERATION			CIRCUIT BREAKER FUNCTIONS
SPACE NO	CONTACT CLOSED CLEARING	CONTACT CLOSED RETURNING	USE OF CONTACT
1	-	-	SPARE
2	0°-10°	10°-0°	FINAL DOWN SNUB
3	0°-88°	88°-0°	CONTROL OF POLE CHANGER
4	0°-44°	44°-0°	DOWN SNUB
5	10°-90°	90°-10°	TO CUT OFF BELL WHEN GATE ARM IS DOWN
6	80°-90°	90°-80°	CONTROL OF SOLENOID PICK UP
7	80°-90°	90°-80°	TO CONTROL GPXR RELAY & KEEP FLASHING LIGHTS OPERATING UNTIL GATES CLEAR
8	0°-5°/80°-90°	90°-80°/5°-0°	UP SNUB
9	-	-	SPARE
10	45°-90°	90°-45°	MOTOR CUTOUT (DOWN)
11	-	-	SPARE
12	0°-90°	80°-0°	OPERATED BY MOTOR CUTOUT SWITCH TO CUT OFF IXY CURRENT FROM SOL PICK UP
13	-	-	NO CAM
14	0°-90°	80°-0°	MOTOR CUTOUT (UP)



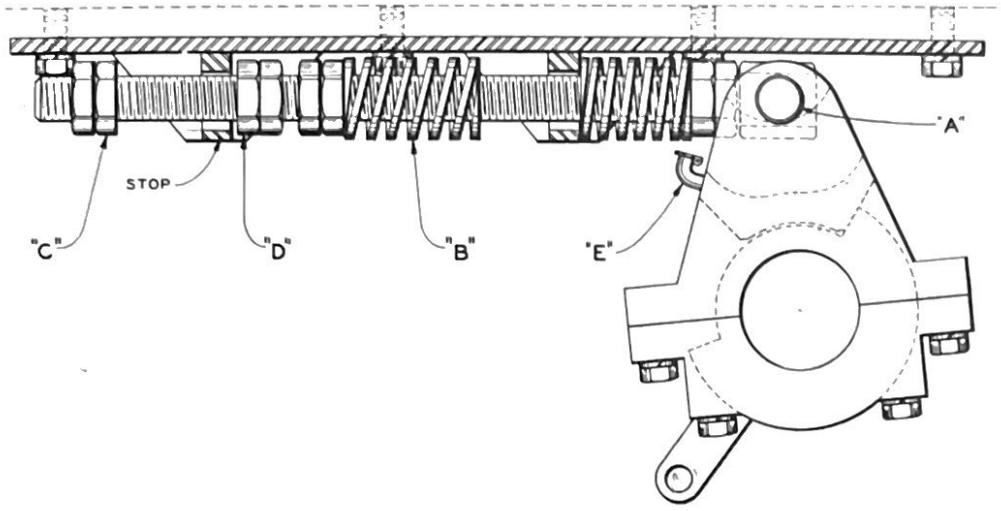
TYPICAL WIRING DIAGRAM

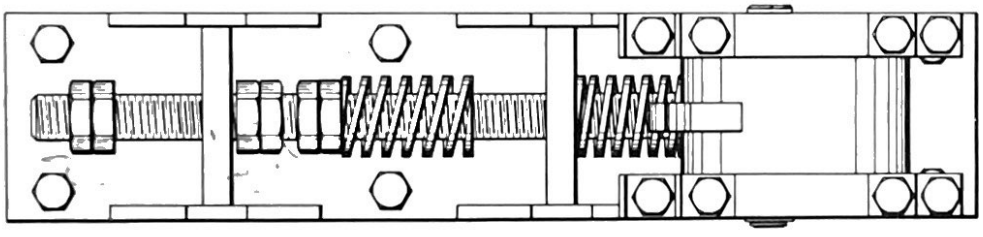
GRISWOLD AUTOMATIC CROSSING GATES

RS3-W12

GRISWOLD SIGNAL CO.
MINNEAPOLIS, MINN

BUFFER





BUFFER

The buffer is mounted inside the pedestal at the top. It is fastened to the pedestal with cap screws and connected to the gate arm shaft with a heavy manganese-bronze casting. The buffer rod is made of alloy steel, heat-treated to maximum strength and toughness. The buffer rod has heavy springs with nuts and locknuts for adjusting compression and other nuts and locknuts, which act as positive stops.

In adjusting the gate arm torque, buffer arm pin "A" should be removed.

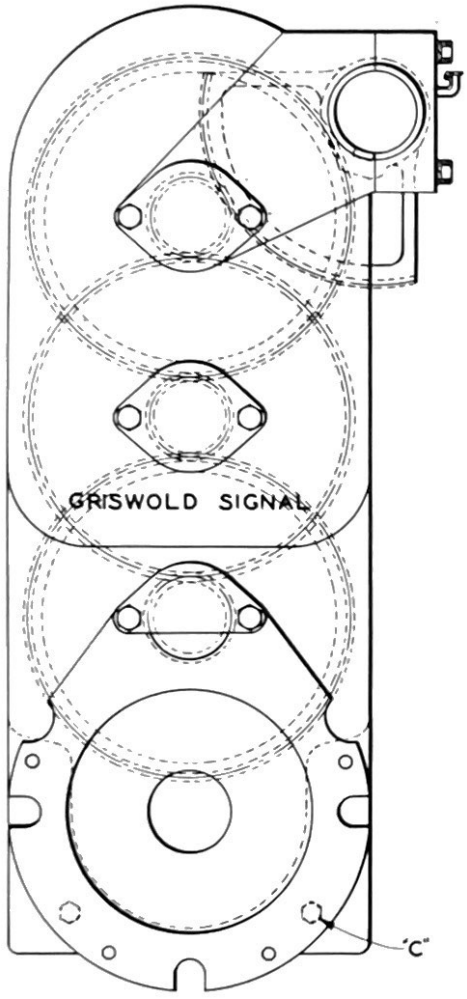
After torque adjustment is made and pin "A" is replaced, the compression spring "B" is adjusted to bring the gate arm to a horizontal position and stop nuts "C" adjusted to just short of the stop.

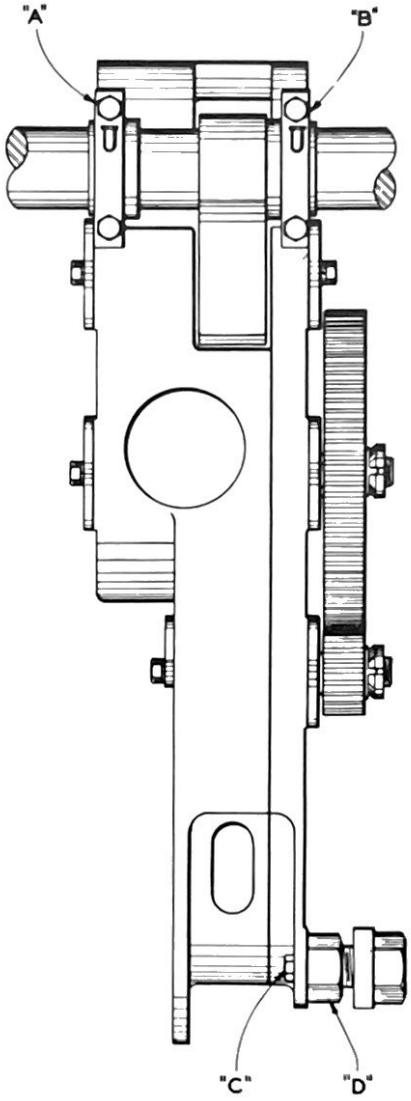
When gate arm has been adjusted in the clear position, see controller, Page 33, nuts "D" should be adjusted and locked about 1/16 inch short of the stop. It is important that these nuts do not touch stop in normal operation, as they could prevent motor switch from snapping off.

Maintenance

Fill oil cup "E" once every three months with Pale Semaphore Oil.

MECHANISM





MECHANISM

The mechanism is a simple chain of gears of extreme ruggedness, housed in a magnesium-aluminum alloy housing. It is light enough for one man to handle, and yet far stronger than will ever be needed to operate the gate. All bearings, except those holding the mechanism to the gate arm shaft are ball bearings, made especially for the job by the bearing manufacturers who pack them with a special grease which will not change consistency with extremes of temperature.

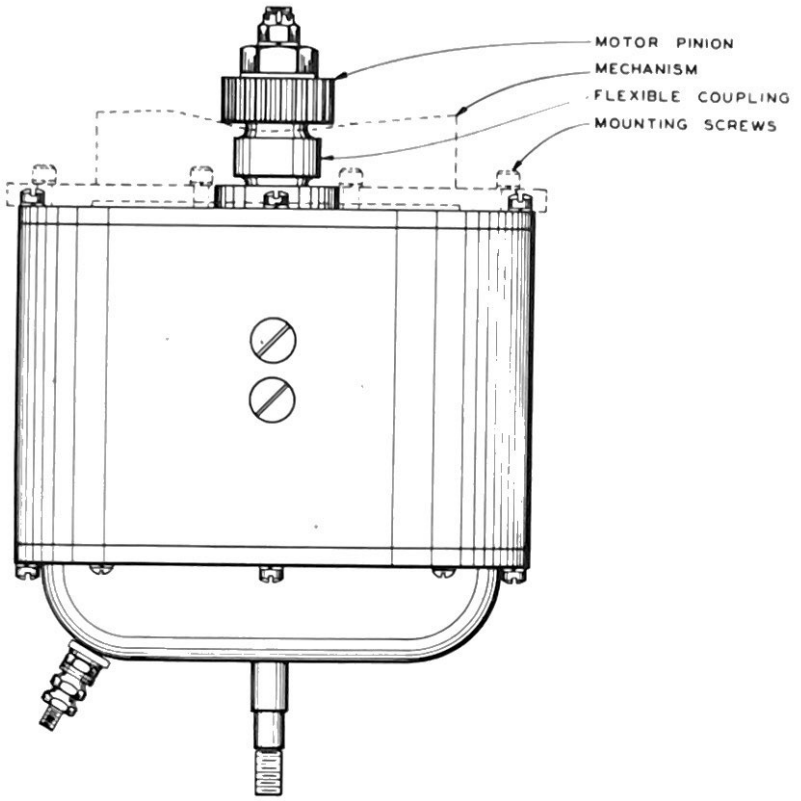
The mechanism is clamped to the gate arm shaft with two split bearings, "A" and "B", and fastened to the pedestal with two cap screws "C". Two collars "D" are used to properly align mechanism with gate arm shaft.

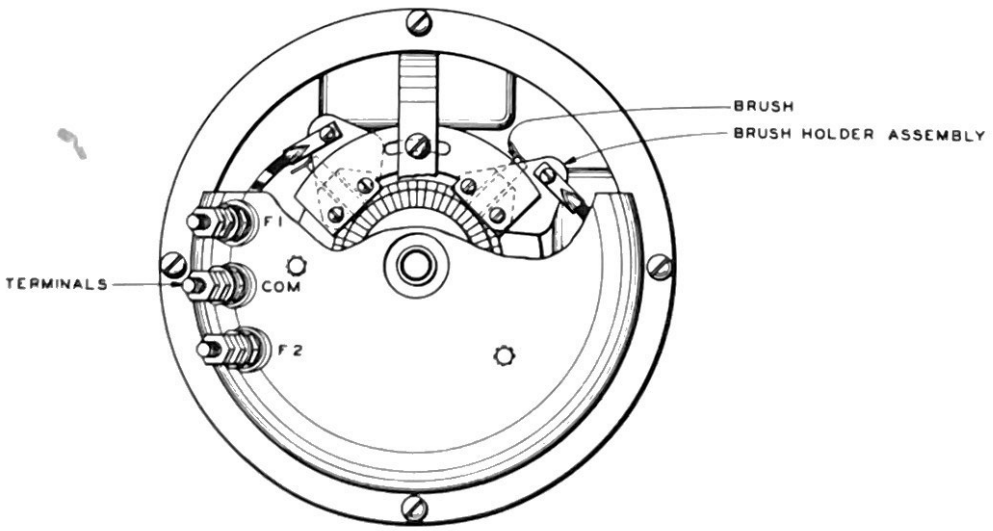
When adjusting counterweights, remove bearing caps "A" and "B", loosen one cap screw "C" and remove the other, allowing the mechanism to swing away from the gate arm shaft. This disengages the mechanism from the segment gear, and with the buffer rod pin removed, leaves the gate arm shaft completely free.

Maintenance

Fill oil cups in "A" and "B", and oil gears once every three to six months with Pale Semaphore Oil.

MOTOR


MOTOR PINION
MECHANISM
FLEXIBLE COUPLING
MOUNTING SCREWS


BRUSH
BRUSH HOLDER ASSEMBLY
TERMINALS
F1
COM
F2

MOTOR

This motor is designed and manufactured exclusively for operating the Griswold Automatic Crossing Gate. It is built for long, trouble-free operation, with a minimum amount of maintenance. The bearings are ball bearings, manufactured especially for the job by the bearing manufacturers. They are packed at the factory with a special grease which will not change consistency with extremes of temperature, and shielded to keep the grease in, and the dirt out.

The motors are built to give more than enough power to operate the longest gate arm with a load of ice and sleet, or in the strongest winds on 12 volts, direct current. Care should be taken to make sure there is little current drop in the motor during operation, due to resistance in the wires from the battery. Should the gate arm become blocked, or, for any reason the motor become stalled for a length of time, the batteries will run down long before any harm can be done to the motor.

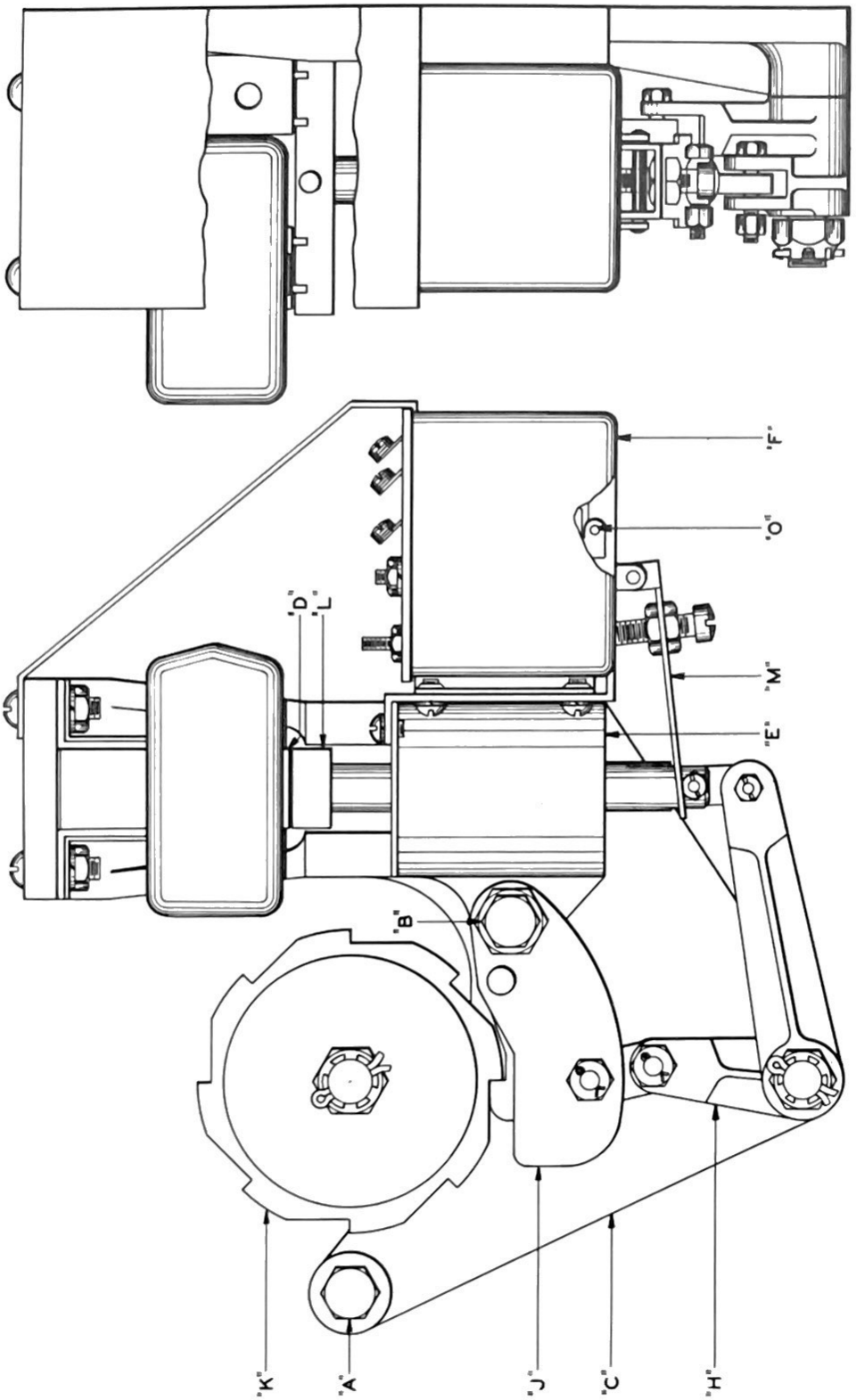
The motor is mounted to the side of the mechanism housing at the bottom with four cap screws. The front motor casting is machined with a hub to pilot in the mechanism housing, thus keeping the motor pinion at the proper center distance from its mating gear.

The motor pinion is mounted on a flexible coupling, having neoprene cushions to absorb any starting shock.

Maintenance

No maintenance is required, except occasional cleaning of commutator and eventual replacement of brushes.

HOLD CLEAR



HOLD CLEAR

The hold clear is one compact unit mounted on the back end of the motor with two cap screws "A" and "B". It is composed of a bronze casting "C", on which are mounted the holding magnet "D", pick-up solenoid "E", pole changer relay "F", bell crank "H", and pawl holder "J". The hold clear ratchet wheel "K", mounted on the end of the motor shaft, is cushioned with a coil spring to relieve the shock of the back lash, and reduce wear.

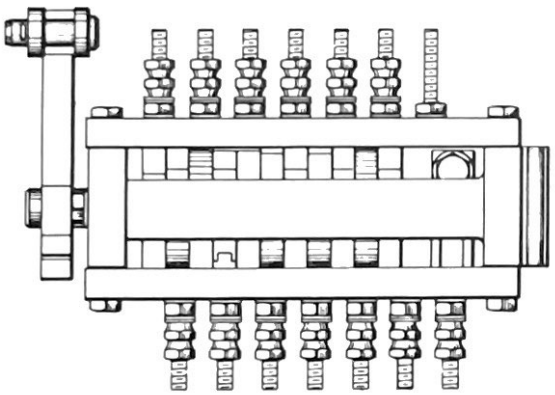
In clearing, the pole changer operates with its own coil, and the holding magnet is energized from the start. When the gate is nearly clear, the pick-up solenoid is energized, picking up the magnet bar "L", and straightening out the linkage, engaging the pawl. The holding magnet through the linkage holds up the pawl and holds the gate clear. The current to the pole changer coil is broken through the controller, immediately after the pick-up solenoid is energized, and the pole changer is held in position mechanically by finger "M". The pick-up solenoid current is cut off with the motor switch, leaving the gate held clear on the holding magnet, using only 24 milliamperes at 12 volts, direct current. The hold clear opens by gravity when the current is cut off.

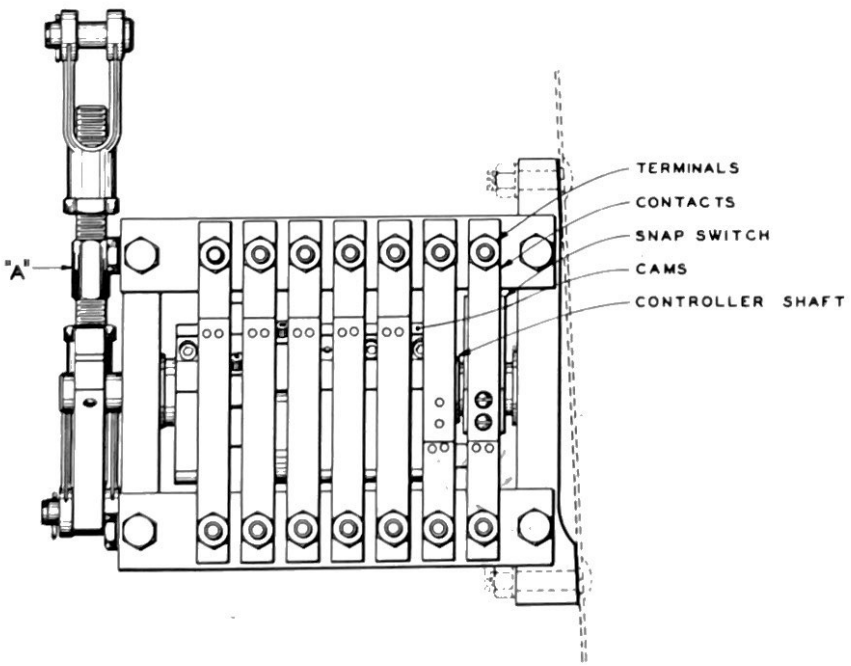
The holding magnet bar has a thirteen-thousandth of an inch air gap.

Maintenance

Care should be taken to make sure no oil gets on the holding magnet bar. A small amount of Pale Semaphore Oil should be applied to pole changer armature hinge "O", with a match or small stick every six months, and a drop or two of Pale Semaphore Oil on each side of the ratchet wheel at the same time.

CONTROLLER





CONTROLLER

The controller is mounted on the side of the pedestal with four carriage bolts. The controller shaft, on which the cams are mounted, has an arm which is connected to the buffer arm catch with a connecting rod "A", and operates with the gate arm shaft. The controller has fourteen sets of terminals, of which twelve have contacts and cams. Ten of the contacts are used in gate control and standard circuits, and two are spares. Two of the contacts, No. 12 and 14, see Page 22, are operated by a snap switch, and the rest are operated by a bakelite faced cam. The contacts are phosphor-bronze springs with silver contact points.

The snap switch is keyed to the controller shaft, and adjusted by turning connecting rod "A". This is adjusted until gate arm latches in a vertical position and locknuts at each end tightened.

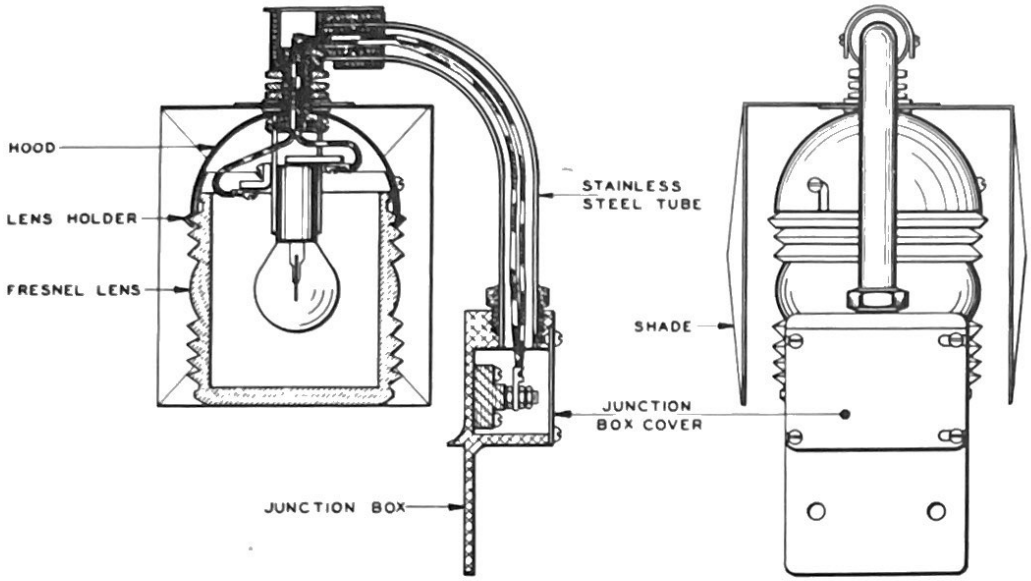
The cams are set at factory in proper relation to the snap switch, and remain in their proper relation throughout adjusting of gate arm location.

Any change in any cam position is done by loosening screw in cam with cam wrench, Figure 3, Page 34, which is furnished with each signal, turning cam to desired position and tightening screw.

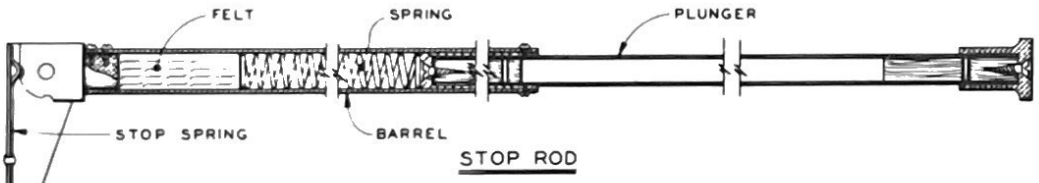
Maintenance

Oil cups are mounted at each end of controller. These should be filled with Pale Semaphore Oil every three months. The pins at each end of the connecting rod should be oiled with the same oil at the same time.

ACCESSORIES

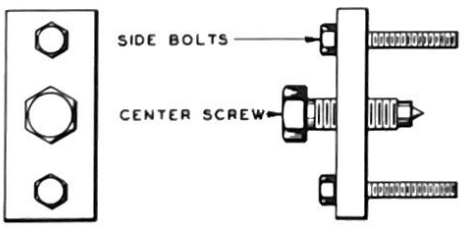


GATE ARM LAMP



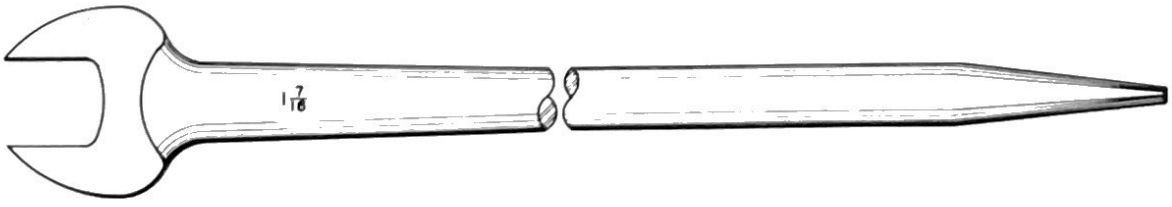
STOP ROD

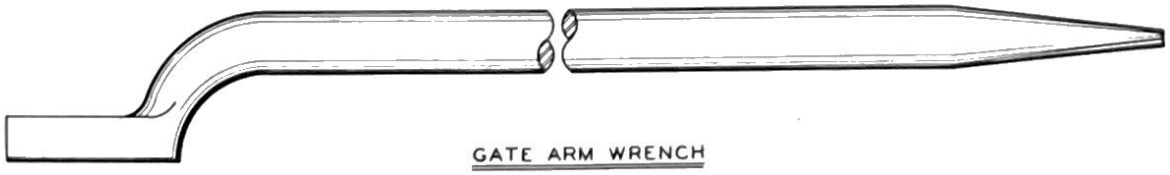
CAM ADJUSTING WRENCH



GATE ARM SUPPORT PULLER

BUFFER ADJUSTING WRENCH





GATE ARM WRENCH

ACCESSORIES

Gate Arm Lamp

The gate arm lamp, see Page 34, is composed of a magnesium-aluminum junction box, on which is mounted a stainless steel tube from which a fresnel lens, housing the bulb, swings. To remove the junction box cover, unscrew the four screws part way, slide the cover to the right, tilt out, and slide ahead. To remove the fresnel lens, unscrew the three screws around the edge of the hood at the top, part way, twist the lens holder to the left, and pull out. The shades have a slotted hole open at one side. They may be adjusted or removed by loosening the nut holding them in place. Shades are furnished only on request.

Stop Rod

The stop rod, see Page 34, is used on gates thirty feet long or longer. It is composed of a stainless steel tube for a plunger, sliding inside a steel barrel. It has a long spring and a piece of oil-soaked felt to give it a buffer action. The stop spring at the top is bolted to the gate with a quarter-inch carriage bolt.

Cam Adjusting Wrench

The cam adjusting wrench, see Page 34, is made to fit the clamp screws on the cams and is insulated to prevent shorting. One cam wrench is mounted in each gate near the controller.

Gate Arm Support Puller

One gate arm support puller, see Page 34, is furnished for each installation. The two side bolts screw into threaded holes in the support casting. The center screw is tightened until the gate arm support comes free.

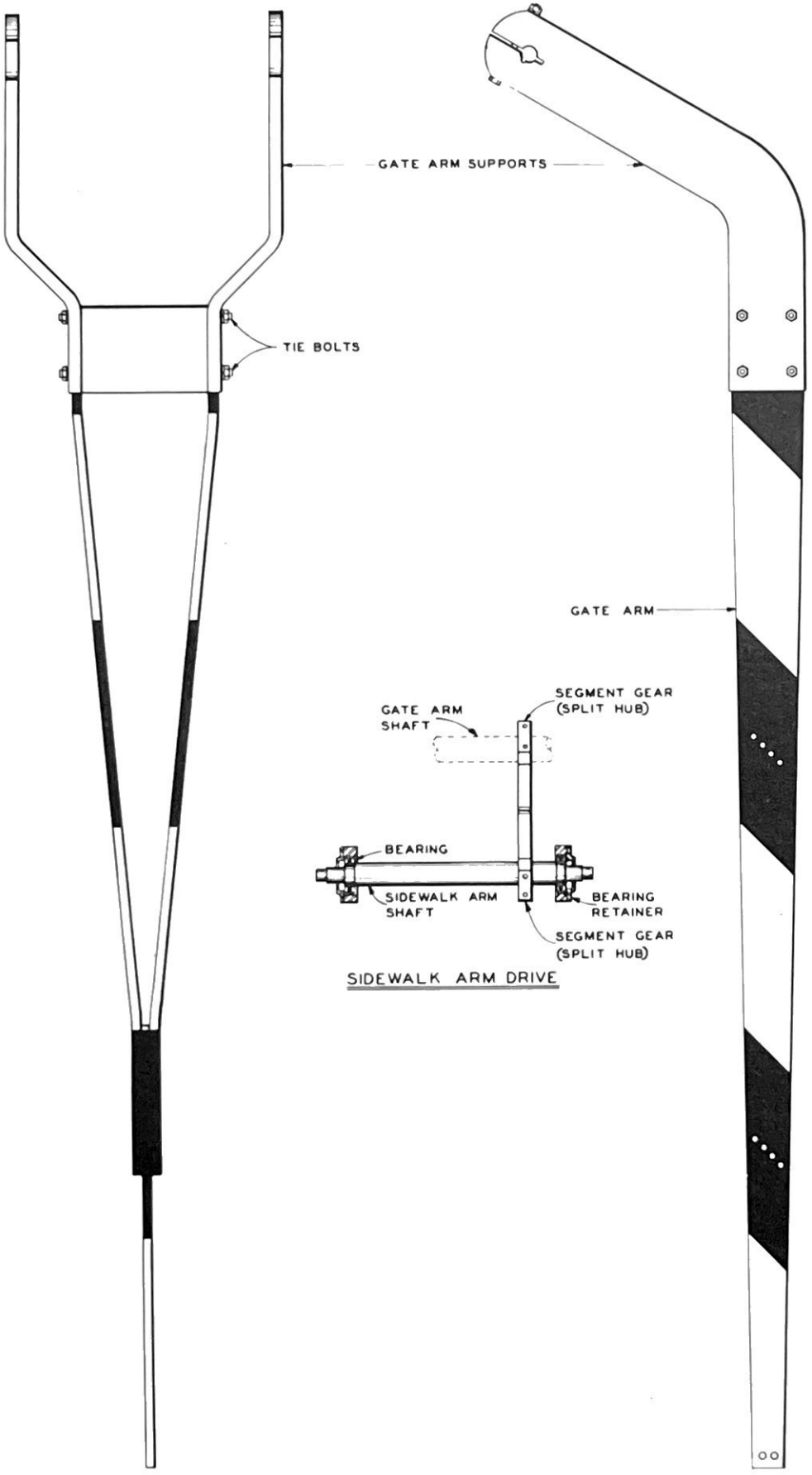
Buffer Adjusting Wrench

The buffer adjusting wrenches are used in pairs. These are not furnished with the gate, but may be purchased from the Griswold Signal Company.

Gate Arm Wrench

The gate arm wrench is for the nut on the end of the gate arm shaft. These are not furnished with the gate, but may be purchased from the Griswold Signal Company.

SIDEWALK ARM SUPPORTS & SIDEWALK ARMS



SIDEWALK ARM SUPPORTS & SIDEWALK ARMS

Sidewalk arm supports are fabricated from 12 gauge steel. They are reinforced and have a solid steel hub which clamps to the sidewalk arm shaft.

Before tightening sidewalk arm supports to sidewalk arm shaft, insert the base of sidewalk arm between sidewalk arm supports and bolt securely with the tie bolts furnished. After sidewalk arm is securely fastened, tighten clamps on end of sidewalk arm supports. This is important, as a loose fit will allow key to wear and cause looseness in the arm.

Sidewalk arms are made from No. 1 clear pine, or redwood, and painted to conform to A.A.R. specifications.

Sidewalk arms are furnished without gate arm lamp, unless otherwise specified. The sidewalk arm is the same for full-sized gate or for individual sidewalk gate.

SIDEWALK ARM DRIVE

Should it become necessary to add a sidewalk arm to a gate previously installed, this can be easily done by adding the sidewalk drive unit, see Page 36. It is not necessary to disturb or change any of the existing mechanism.

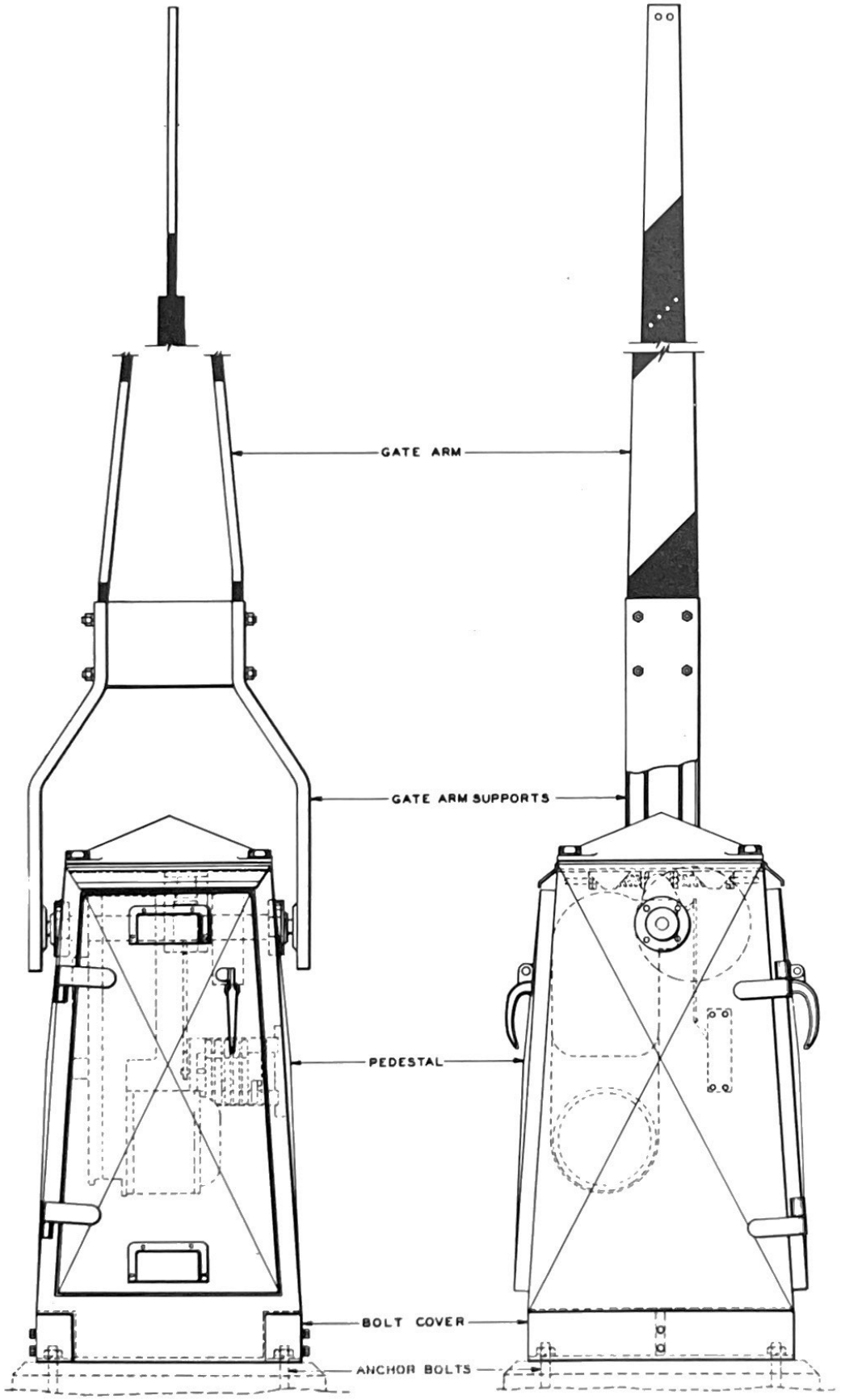
The sidewalk arm drive unit consists of a shaft, two steel segment gears, two bearings of the kind used in the rest of the gate, two bearing retainers with grease shields in them, and four keys.

To install sidewalk arm drive, first remove covers from sidewalk bearing holes. The holes have been painted to protect them, and it will be necessary to scrape out the paint before the bearings will fit.

Before inserting sidewalk arm shaft, clamp segment gear with two-piece hub to main gate arm shaft, using extra key which is furnished. The two-piece hub makes it possible to add the segment gear without disturbing main shaft in pedestal. Place the split hub segment gear on the sidewalk arm shaft, and insert shaft into bearing holes. Do not tighten hub in segment gear, but keep it to the side so it does not mesh with the gear on the main gate arm shaft. Place bearings on shaft and in bearing holes in pedestal. Bolt bearing retainers in place, using cap screws from cover plates that were on before.

After sidewalk arm is installed, lower the gate arm to horizontal position, and holding sidewalk arm horizontal, slide segment gear on shaft until it meshes with segment gear on gate arm shaft. Tighten hub clamp on segment gear, and gate is ready to operate.

SIDEWALK GATE



SIDEWALK GATE

The Griswold Automatic Sidewalk Gate is composed of a steel pedestal, smaller than the Griswold Automatic Crossing Gate, which houses the same controller, operating mechanisms, motor, hold clear, and necessary terminals and resistors. The buffer is similar to the buffer on the larger gate. On the outside of the pedestal are mounted sidewalk arm supports and sidewalk arms only.

The Griswold Automatic Sidewalk Gate uses the same foundation as the Griswold Automatic Gate, see Page 6. Everything contained in the pedestal is assembled in place and adjusted at the factory. All wiring from motor, hold clear, controller, etc., is installed and run-to terminals on the sidewalk pedestal.

Sidewalk arms and supports must be assembled in the field.

The counterweight is located inside the pedestal on the shaft, and is set to help operate the gate by gravity, if necessary.

The sidewalk gate is adjusted to drive down under power to 45 degrees.

Maintenance on the Griswold Automatic Sidewalk Gate is the same as on the Griswold Automatic Crossing Gate.

NOTES